DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 500

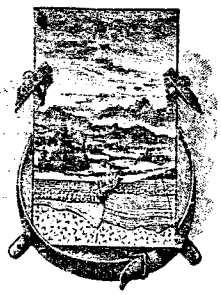
GEOLOGY AND COAL FIELDS

OF THE

LOWER MATANUSKA VALLEY

ALASKA

G. C. MARTIN AND F. J. KATZ



WASHINGTON
GOVERNMENT PRINTING OFFICE
1912

ical observations at Chickaloon.

ure (°F.).					
Noon.			Days with precipitation.		Clear days.
Maximum.	Minimum.	Mean.			
42	17	32	3 (snow)		1
40	3	15	4 (snow and rain)		12
32	−28	10	3 (snow)		18
30	−15	15	8 (snow)		12
46	− 6	36	5 (snow and rain)		14
43	10	32	7 (snow)		15
52	36	44	4 (snow)		20
64	46	55	3 (rain)		14
73	50	61	0		12

wfall at Chickaloon.

	Inches.
	9¼
	13¾
	9½
	23¾
	8¾
	30
	4¼
	99¼

ow on the level; April 14, 1908, 2 feet 6 inches

Bureau has courteously supplied the ficks at Chickaloon during the period 1911. They are summarized in the

Chickaloon, Alaska, March, 1910–March, 1911.

Minimum.	Total precipitation (inches).	Snow (inches).			Days with 0.01 inch or more precipitation.	Clear days.	Partly cloudy days.	Cloudy days.
		Total fall.	On ground on 15th of month.	On ground at end of month.				
−12	0.03	7	38	32	2	17	6	8
− 8	.20	.....	30	12	2	15	9	6
24	.12	.....	.....	.....	2	11	11	9
26	1.19	.....	.....	.....	7	6	8	16
38	1.42	.....	.....	.....	10	11	7	13
30	.39	.....	.....	.....	4	13	10	8
21	1.16	.....	.....	.....	8	11	9	10
− 7	.21	5	.....	3	3	8	10	13
− 5	.27	6.5	4	6	3	17	4	9
−25	.51	9	9	11	3	16	4	11
−33	.84	13	12	19	4	18	4	9
−38	2.37	24	22	24	9	9	5	14
−27	1.55	18	34	30	6	16	4	11

VEGETATION.

Timber line in this area is at a general elevation of 2,000 to 2,500 feet, above which there is the customary growth of small bushes, moss, and grass. The trees include spruce, birch, and several kinds of cottonwood. The growth is in general not dense. Most of the spruce trees are under 12 inches in diameter, the largest one which the writers noted having a circumference of 5 feet. The timber is probably sufficient for any local demands that can now be foreseen, provided that forest fires, which the dry climate favors, are kept under control. There is no timber suitable for export.

The more open birch forests, as well as the areas which have lately been burned, are covered with a dense growth of grass. These natural meadows are large enough to furnish feed for whatever stock is likely to be locally needed.

ACCESSIBILITY.

The Matanuska Valley is at present reached from Knik, which is the head of navigation on Cook Inlet and to which vessels of shallow draft can go at high tide. Near the lower end of Knik Arm there is a good anchorage, which ocean-going vessels can reach at any stage of the tide except during the winter, when the whole upper part of Cook Inlet is frozen.

There is a good horse trail from Knik to the upper end of Matanuska Valley, and the character of the ground and of the vegetation is such that this trail could be made into a wagon road at comparatively slight expense. It takes horses from one to two days to reach Moose Creek, depending on the load, and from a day to a day and a half to go from Moose Creek to Chickaloon River.

At present freight can not be taken in while Cook Inlet is frozen, which is usually from October 15 to May 15, and passengers can reach the region during the winter only by going in from Seward with sleds.

The Alaska Northern Railroad, which is now completed from Seward to Kern Creek, on the north shore of Turnagain Arm, a distance of 72 miles, is intended to reach Matanuska Valley, to which surveys have been made; some construction work has been done between Kern Creek and Knik Arm. According to the present surveys it will be about 150 miles from Seward to Chickaloon River. When this road is completed the Matanuska Valley will be easily accessible at any time of the year.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 520—E

GOLD DEPOSITS
OF THE
SEWARD-SUNRISE REGION
KENAI PENINSULA, ALASKA

BY

BERTRAND L. JOHNSON

ADVANCE CHAPTER FROM BULLETIN 520, "MINERAL RESOURCES OF ALASKA, 1911"

WASHINGTON
GOVERNMENT PRINTING OFFICE
1912

running on the inlet for transportation to points on Cook Inlet, Turnagain Arm, and Susitna River. Sunrise and Hope, at the mouths of Sixmile and Resurrection creeks, respectively, and Girdwood, at the mouth of Glacier Creek, are small settlements, important as distributing points for the placer and lode diggings in their vicinity. The population of these places is small, Sunrise having but 12 inhabitants in September, 1911, and Hope only 35 or 40 in the winter of 1910–11. Kern Creek, the present terminus of the Alaska Northern Railway, is a transfer point of supplies from Seward to Turnagain Arm points and Knik.

TRANSPORTATION.

WATER TRANSPORTATION.

Steamships of the Alaska Coast Co. and the Alaska Steamship Co. run regularly between Seattle and Seward throughout the year, for navigation in Resurrection Bay is never interrupted by ice. Water transportation on Cook Inlet, however, is possible only during a part of the year, for ice prevents navigation on the upper part of the inlet for about five months. During the summer of 1912 the western terminus of the Alaska Coast Co. will be at Kodiak and the steamers of this company will make several trips to Knik Anchorage, serving upper Cook Inlet points directly or by barge from Knik Anchorage instead of making the transfer of passengers and freight, as formerly, at Seldovia and Port Graham to the smaller boats plying on the inlet. The larger boats can not enter Turnagain Arm, however, and small gasoline boats, of 80 to 100 tons, which can reach the various settlements at high tide, will still have to be used between Kern Creek, Girdwood, Sunrise, and Hope and the ocean-steamer terminus in Knik Anchorage.

The Alaska Northern Railway offers a possible freight route from Seward to Turnagain Arm, but because of the high freight rates charged by the railroad most of the freight from Seattle to points on Turnagain Arm has come by water, by way of Seldovia and Cook Inlet, a rate of $8 a ton being the usual charge between Seldovia and Sunrise, Hope, or Girdwood. Water transportation on the peninsula is restricted at present to Kenai Lake, where several small gasoline launches were in operation last summer. This lake is reported to freeze over about January 1 and to open up late in May.

LAND TRANSPORTATION.

The Alaska Northern Railway Co. has built 71 miles of standard-gage track from Seward to Kern Creek, near the head of Turnagain Arm. This line was in operation in 1911, gasoline passenger cars being run almost every day during the summer. The passenger

rates in 1911 were 2[illegible] cents a
tickets. Freight trains were r
maintained on this line only d

Wagon roads have been built
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and from Girdwood to the
Creek. Roads have also been
Lynx Creeks to prospects nea
mission has cut good trails fr
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Creek. During the summer
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by way of Crow Creek Pass a
laid out down Canyon Creek

Most people living away fro
dog teams for transportation o
are run at irregular intervals
Railway to Hope and Sunrise
to Mills Creek. The follow
$0.0025 per pound per mile, we

Freighting charges

Sunrise to Hope
Sunrise to Gulch Creek
Sunrise to Lynx Creek
Sunrise to Mile 34, Alaska No
Gulch Creek to Mile 34, Alask
Mile 29, Alaska Northern Rai

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Mail from the outside arrive
throughout the year. From D
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Johnson Pass, but in exceptio
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Inlet and Turnagain Arm goes
by small gasoline boats. Durin
at points on Turnagain Arm a
transportation facilities.

POWER

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ORTATION.

, has built 71 miles of standard-
Creek, near the head of Turn-
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rates in 1911 were 20 cents a mile, or 15 cents a mile on round-trip tickets. Freight trains were run only occasionally. The service was maintained on this line only during the summer and fall.

Wagon roads have been built from Sunrise to Mile 34 on the Alaska Northern Railway, from Hope for several miles up Resurrection Creek, and from Girdwood to the Nutter-Dawson placer camp on Crow Creek. Roads have also been built from the mouths of Bear and Lynx Creeks to prospects near the heads. The Alaska Road Commission has cut good trails from Hope to Sunrise and from Mile 29 on the Alaska Northern Railway through Moose Pass to Slate Creek. During the summer of 1911 the commission finished the portion of the Seward-Iditarod trail between Kern Creek and Knik, by way of Crow Creek Pass and Eagle River. A trail has also been laid out down Canyon Creek from Moose Pass to the Sunrise road.

Most people living away from the towns in the winter use their own dog teams for transportation of supplies. In the summer pack trains are run at irregular intervals from Mile 34 on the Alaska Northern Railway to Hope and Sunrise and from Mile 29 through Moose Pass to Mills Creek. The following rates, averaging approximately $0.0025 per pound per mile, were charged in 1911:

Freighting charges in Seward-Sunrise region.

	Cents per pound.
Sunrise to Hope	2½
Sunrise to Gulch Creek	2
Sunrise to Lynx Creek	4 and 5
Sunrise to Mile 34, Alaska Northern Railway	7
Gulch Creek to Mile 34, Alaska Northern Railway	5 and 6
Mile 29, Alaska Northern Railway, to Mills Creek	5

MAIL SERVICE.

Mail from the outside arrives in Seward about six times a month throughout the year. From December 1 to March 31 mail for Sunrise and Hope is carried overland twice a month, usually through Johnson Pass, but in exceptionally bad weather by way of Moose Pass. From April 15 to October 31 mail for settlements on Cook Inlet and Turnagain Arm goes to Seldovia, whence it is forwarded by small gasoline boats. During the early spring the mail deliveries at points on Turnagain Arm are infrequent on account of the poor transportation facilities.

POWER RESOURCES.

The possible sources of power for use in mining in this region are the abundant timber below 2,000 feet elevation, the steep gradient and numerous falls of many of the streams, the lignite of the Cook Inlet region, and the higher-grade coals of the Matanuska Valley.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 525

A GEOLOGIC RECONNAISSANCE

OF THE

FAIRBANKS QUADRANGLE, ALASKA

BY

L. M. PRINDLE

WITH A

DETAILED DESCRIPTION OF THE FAIRBANKS DISTRICT

BY

L. M. PRINDLE AND F. J. KATZ

AND AN

ACCOUNT OF LODE MINING NEAR FAIRBANKS

BY

PHILIP S. SMITH

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

POPULATION AND LOCAL INDUSTRIES.

The town of Fairbanks, located on a slough of Tanana River (Pls. I and II, in pocket), is the commercial center of the most important part of the quadrangle, namely, of the placer district which lies close at hand. Its permanent population numbers probably several thousand. Chena, the second largest town in the quadrangle, with a population of several hundred, is situated on Tanana River where the slough connecting with Fairbanks discharges. Many smaller settlements have been established in accord with the needs of the placer-mining industry, several being located on Tanana River. It is probable, however, that the total permanent population of the quadrangle outside of Fairbanks and Chena does not exceed 2,000 persons. In addition there is an influx each summer of transients, whose number varies with the demands of the mining industry or with the excitement caused by new discoveries of gold. The sawmills in the Tanana Valley and the near-by region supply the local needs for lumber, and the neighboring ranches provide potatoes, vegetables, hay, milk, and eggs. With an excellent local market, competing only with supplies brought in at heavy expense, farming has been very profitable, and the further expansion of the industry is dependent only on the continued prosperity of the mining operators. Outside of the articles mentioned above, the region supplies nothing but fish and game and some wild fruits. Fur-bearing animals are too scarce in the immediate vicinity of the mining camps to supply even the local demand.

Fairbanks is an attractive town, built on the flood plain of Tanana River and provided with all the essentials and many of the luxuries of modern life. It has two banks, several hotels and newspapers, an electric-light plant, and a telephone system that connects with the placer camps of the vicinity. The military telegraph lines keep it in touch with the outside world.

MEANS OF COMMUNICATION.

The transportation of freight from points on the Pacific coast to the Fairbanks region is accomplished by way of Dawson and the upper Yukon and by way of St. Michael and the lower Yukon. Freight brought by the largest boats plying on the Yukon must transship at Tanana to boats of lighter draft. Transportation rates from Seattle during 1908 averaged about $75 a ton on ordinary freight and $125 to $140 for a first-class passage. At least three weeks is required from Pacific coast points to Fairbanks by either route. The supplies are brought by steamer to the towns of Chena and Fairbanks, which are the intermediary points between the outside world and areas where mining is in progress. The areas of present importance are well within about 30 miles of these supply points. Local transportation is afforded by the Tanana Valley Railroad,

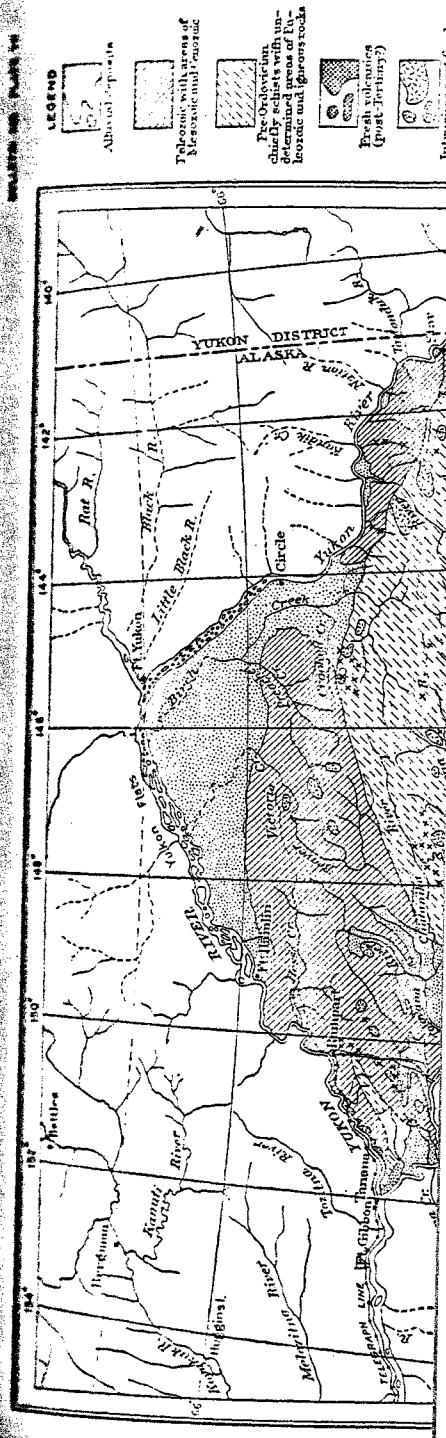
about 45 miles long, extending between Fairbanks and Chena and from an intermediate point to Chatanika. This railroad (Pl. XII, *B*, p. 86) and a system of excellent wagon roads greatly facilitate the transportation of the heavy machinery rendered necessary by present conditions. Through their agency the freight rates from Fairbanks to the creeks, which were formerly about 5 cents a pound in winter and 25 cents a pound in summer, have been reduced to a few cents a pound for summer freights to the most extreme points.

Through the improvements the Alaska Road Commission has been making the Valdez trail has become the important winter route from Fairbanks to the coast and has been changed to a wagon road that is available for summer travel also. The region, however, is still dependent for the most part on routes that are available during the summer only, and travel is often subjected to costly delays in the spring by low water in the upper river and by ice in Bering Sea. A direct route, open throughout the year, for the transportation of supplies from Pacific coast points, is not yet available.

Although travel and transportation in the region immediately tributary to the town of Fairbanks have been rendered easy and, compared with the past, inexpensive, the conditions outside of this zone are almost as primitive as they were a decade ago, when the first influx of prospectors took place. The Salcha and Tenderfoot placer camps can be reached in summer by horse trail and in winter by sled roads. The placers on the upper Chena are even less accessible under favorable water conditions. Small steamers ascend the Tanana above the town of Chena as far as the mouth of Delta River, but at best they afford unreliable means of communication. Small boats can ascend streams like the Tolovana, Chena, and Salchaket, but they are very expensive for handling freight. A horse trail connecting Fairbanks with the Birch Creek placer camp passes near the gold deposits of the upper Chatanika. Supplies for this region are sledded in winter, as they are elsewhere in the region outside of the zone near Fairbanks tapped by wagon roads and the railway. With the exceptions noted above, the means of communication are entirely inadequate to the needs of the country. Until more railways and wagon roads are built there is little incentive to develop any except the richest placer deposits.

GEOLOGY OF THE YUKON-TANANA REGION.

Two dominant structural trends of Alaska, one southeast and northwest and the other northeast and southwest, intersect in the Yukon-Tanana region and give to the province an important structural position. Numerous individual formations also possess complicated structures. The field has been one of sedimentation, diastrophism, widespread metamorphism, abundant intrusion, and vol-



DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, DIRECTOR

BULLETIN 533

GEOLOGY

OF THE

NOME AND GRAND CENTRAL QUADRANGLES

ALASKA

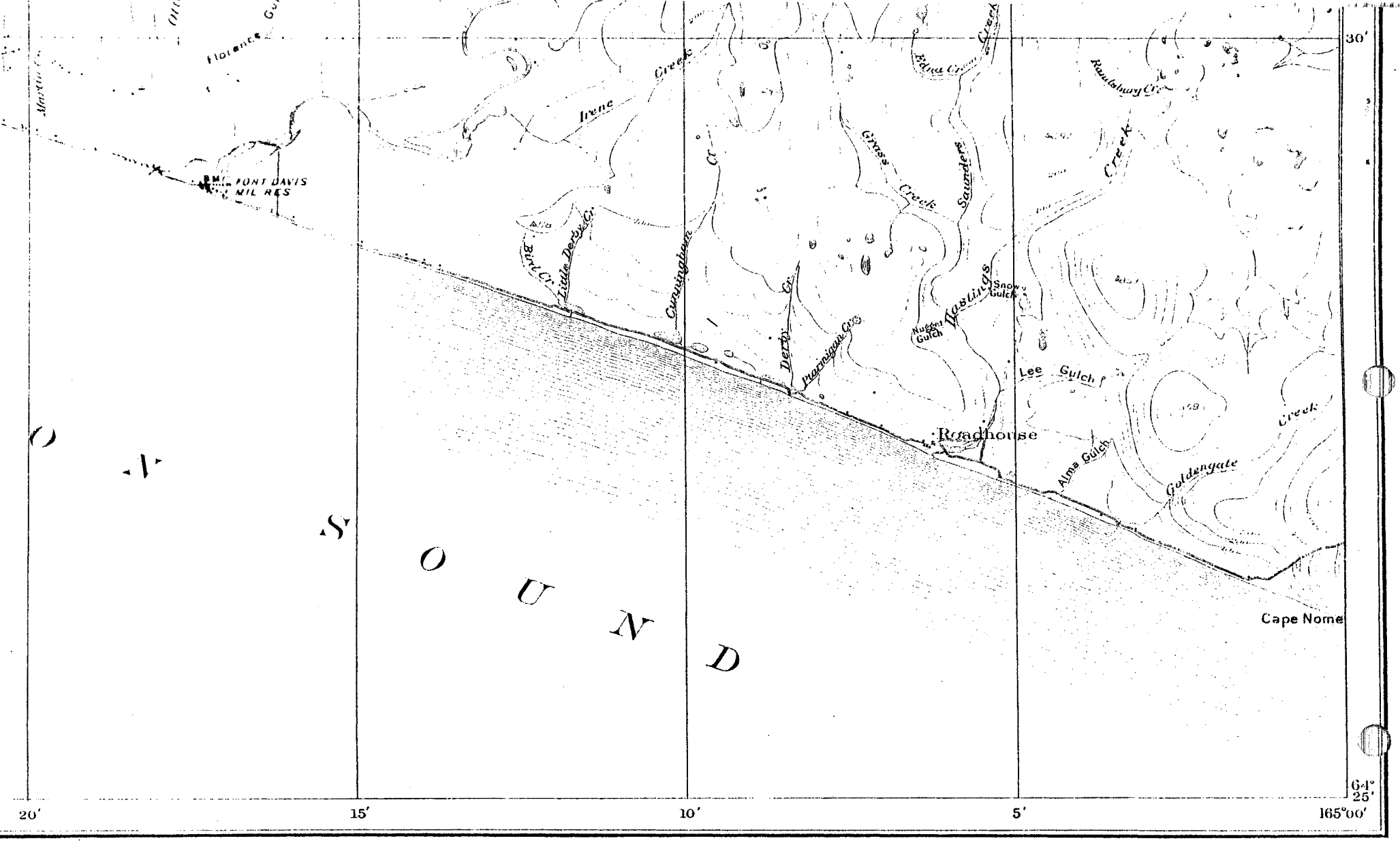
BY

FRED H. MOFFIT

WASHINGTON

GOVERNMENT PRINTING OFFICE

1913



GRAPHIC MAP OF NOME QUADRANGLE, ALASKA

Scale $\frac{1}{62500}$

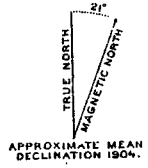
½ 0 1 2 3 4 Miles

1 ½ 0 1 2 3 4 5 Kilometers

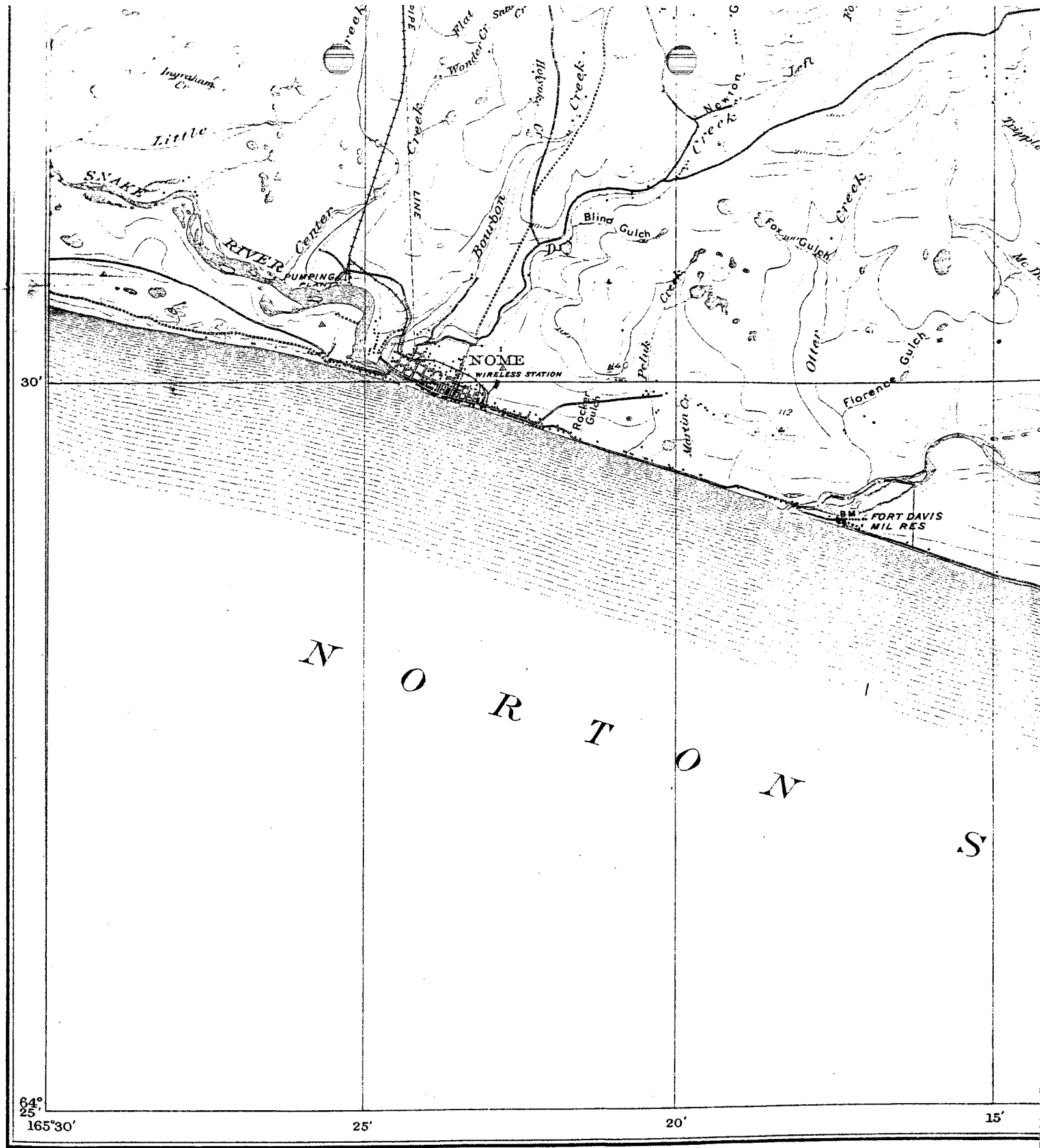
Contour interval 25 feet

Datum is mean sea level

1913



House Doc. No. 1428; 62d Cong., 3d Sess.



Alfred H. Brooks, Geologist in charge of division.
Topography by T. G. Gerdine, R. B. Oliver, and W. R. Hill.
Control by U. S. Coast and Geodetic Survey.
Surveyed in 1904.
Railroad unsurveyed; position approximate.

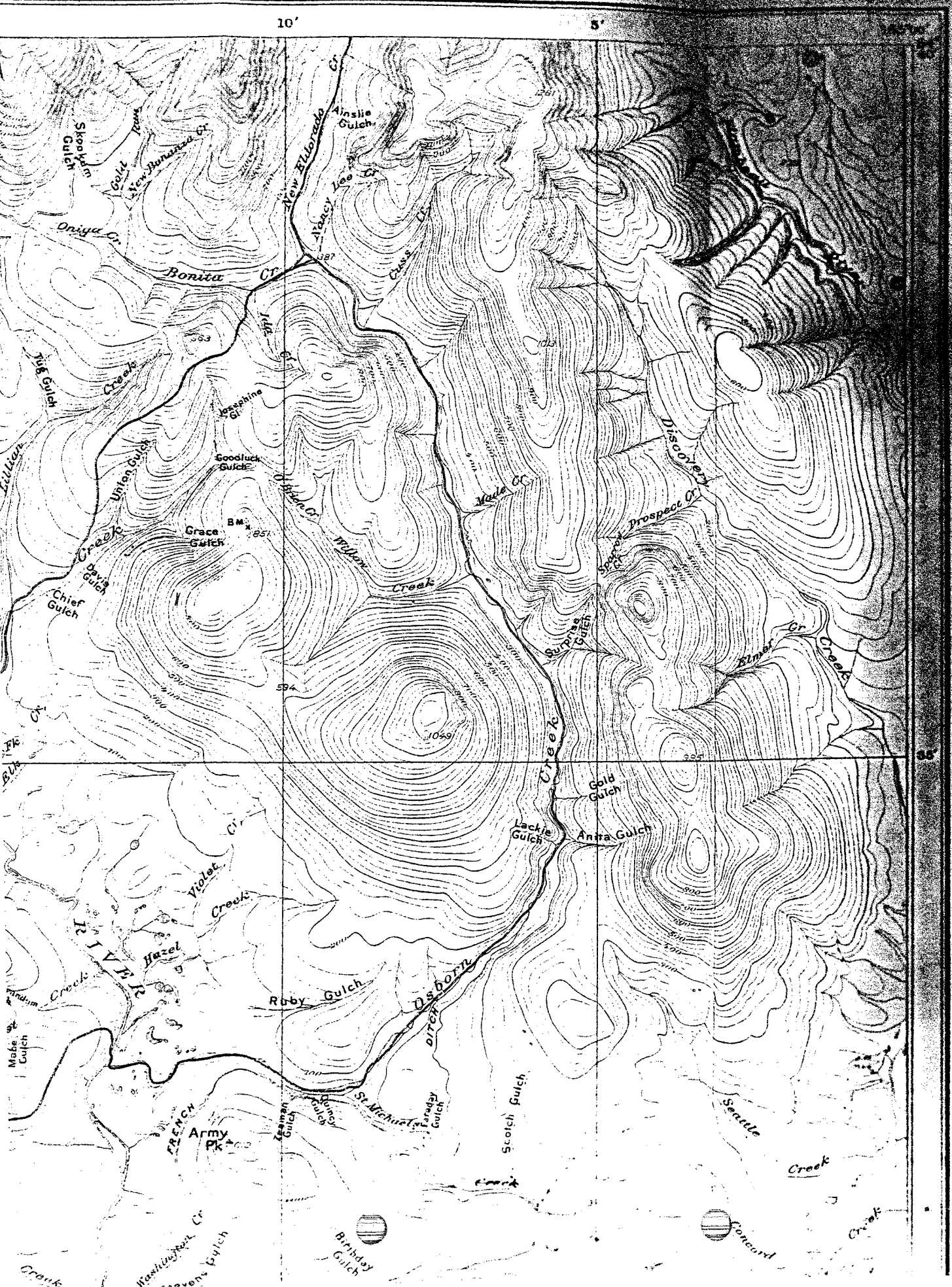
TOPOGRAPHIC MAP OF NOME

Scale 1/62500

Contour interval 25 f

Datum is mean sea lev

1913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Union Gulch
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Grace Gulch
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Davis Gulch
Chief Gulch
Million Creek
Maule Cr
Discovery
Sparrow Prospect Cr
Surprise Gulch
Elmer Cr
Creek
Gold Gulch
Lackie Gulch
Anita Gulch
Violet
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Ruby Gulch
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Army Pk
Quincy Gulch
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DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 534

THE YENTNA DISTRICT

ALASKA

BY

STEPHEN R. CAPPS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

moss-covered surface was in many places observed to consist of dome-shaped hummocks (Pl. VII, *B*), the origin of which is not clear.

Some edible berries grow within the region, the most important of which are blueberries and cranberries above timber line and some raspberries, currants, and high-bush cranberries in the timbered areas.

POPULATION.

Until the discovery of gold in 1905 there were no permanent settlements of white men in the whole Yentna district, and very few white men had visited it at all. In 1905 there were less than a dozen men prospecting on the various creeks, and in 1906 it is reported that about 50 men were prospecting and mining on Peters and Cache creeks and their tributaries, an unrecorded number being similarly engaged on the headwaters of Lake Creek. No records have been kept for the years 1907 to 1910, but in 1911 about 100 men were working on Cache and Peters creeks, 10 men in the area between Lake Creek and the Yentna, and perhaps half a dozen on Kichatna and Nakochna rivers, south of the Yentna, or a total of about 116 within the Yentna district. There are no permanent native settlements in the Yentna basin, the nearest being at Susitna and at Alexander, on Susitna River. The Indians spend the summer and most of the winter on the main river, where they have rather comfortable log cabins. The summers are largely occupied in catching and drying fish, an occasional hunting trip being undertaken for fresh meat. The natives along the Susitna are familiar with the country drained by the Yentna, and make hunting and trapping expeditions into it in the fall and winter.

SUPPLIES AND TRANSPORTATION.

The only practicable route to the Yentna district is by way of Susitna and Yentna rivers. During the summer months the Alaska Northern Railroad may be used from Seward to the head of Turnagain Arm. From the terminus of the railroad, as well as from Seldovia and other points on Cook Inlet, launches carry both passengers and freight up Susitna River to Susitna Station, which is the center of supplies for the Yentna country. Launches make occasional trips during the summer from Susitna Station up the Yentna, which is navigable for light-draft boats almost all the way to the forks of the river. A trading station was formerly maintained on the Susitna near the mouths of Talkeetna and Chulitna rivers, and a stern-wheel steamboat plied up the river to that point. This station has now been abandoned, and the steamboat taken to another part of Alaska. The route most followed to the placer camps in the neighborhood of Cache Creek leaves the Yentna at McDougall, a small village at the mouth of Lake Creek. From McDougall a wagon road

A. PASS BETWEEN
SLATE AN

B. MOSS

has been built, which follows the east bank of Lake Creek upstream for about 15 miles and then swings across to Kahiltna River. A bridge which was built across the Kahiltna was washed out in the spring of 1911, so that it was necessary to swim horses at this point, passengers crossing in rowboats. Beyond the Kahiltna the trail follows the high ground along the west slope of Peters Hills and across several miles of marshy ground, which in summer may be crossed by horses with difficulty. Cache Creek valley is reached at the mouth of Spruce Creek and followed upward from that point. As supplies can be transported overland much more cheaply by sled in winter than by any means in summer, and as the winter is the season during which the miners have most leisure, open-cut mining methods being impossible until the streams run free of ice in the spring, almost all of the freighting is done in winter, either from Susitna Station or from McDougall. From the former point the sled route follows Susitna and Yentna rivers either to the mouth of Kahiltna River or to McDougall, depending on the part of the country to be reached. Much of the freight for Peters Creek and its tributaries has been taken up Kahiltna River and Peters Creek. Practically all of the freighting for Cache Creek is done by way of McDougall and the wagon road to the Kahiltna. From the trail crossing at Kahiltna River the winter route most used ascends Kahiltna Valley for some miles and then swings up the slope to meet the summer trail a few miles south of Cache Creek. Until 1907 this region was supplied in summer by a pack train, which used a trail from a point on Yentna River near the forks and, following a course parallel with the base of the mountains, crossed the Kahiltna just below the glacier. It then lay along the northwest edge of the Cache Creek basin and terminated at Home Lake, in the Tokichitna Valley. This trail is now little used, and though portions of it can still be distinguished it is for most of its length so overgrown by brush and grass that one not familiar with its course would have difficulty in following it.

The diggings in the basin of Twin Creek are most often reached by following the Yentna to McDougall, from which supplies are sledded up the wagon road to a point more than half way to the Kahiltna. Here a winter trail branches to the westward and follows up Lake and Camp creeks. In leaving the country in the fall the miners from Twin Creek usually build boats or rafts and float down the Yentna. From Cache Creek the trail and road are used to McDougall and launches are taken from that point to Susitna Station. From the headwaters of Peters Creek the trail to Tokichitna River is often followed, and boats are built to descend this stream and the Chulitna to Susitna River.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 535

A GEOLOGIC RECONNAISSANCE

OF A PART OF THE

RAMPART QUADRANGLE

ALASKA

BY

HENRY M. EAKIN

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

No reptiles are known in the region. A single amphibian, a small green frog, is rather common.

Fish are abundant in all the streams that are not polluted by mining operations. The grayling and brook trout frequent even the smallest brooks. The king, silver, and dog salmon run up the larger streams annually. Pike and whitefish live in the Yukon and Tanana, and the pike is said to inhabit also some of the larger lakes.

POPULATION.

The inhabitants of the Rampart and Hot Springs districts have varied in number and have shifted from place to place with the changing fortunes of mining operations. The oldest settlements persisting at the present time are Rampart, near the mouth of Minook Creek, and Tanana, below the mouth of Tanana River. Hot Springs, on a slough of the Tanana; Glen, on a tributary of Baker Creek; and Tofty, on Sullivan Creek, have developed as supply points for the mines of the Hot Springs district. A small group of cabins and roadhouses on the bank of the Yukon near the mouth of Grant Creek is the only other white settlement in the region.

Rampart is said to have had a population of about 1,500 during its best days in 1898 and 1899.[1] Since then its population has dwindled to the present number—a little more than a score. The town of Tanana, independent of Fort Gibbon, a United States military post situated there, has a population probably fluctuating between 200 and 300. Tofty and the immediate neighborhood could number during the summer about 150 persons, but this figure would be greatly affected by any change in mining operations. The other settlements mentioned have only a few residents each—probably 50 all told.

The native population is said to be greatly reduced from its number two decades ago when few white men had visited the region. At present the principal native settlement is a mile above Tanana on the Yukon, where there are a mission and a school. There is another small village near the mouth of Tozitna River and a few natives live near Rampart.

MEANS OF COMMUNICATION.

Yukon and Tanana rivers give easy access to all parts of the region and they are navigated by a fleet of well-equipped steamboats. The freight rates from Seattle vary with the nature of the commodities and the route traversed, as indicated in the following table:

[1] Prindle, L. M., The Fairbanks and Rampart quadrangles, Yukon-Tanana region, Alaska: Bull. U. S. Geol. Survey No. 337, 1908, p. 60.

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ce then its population has dwindled
more than a score. The town of
bon, a United States military post
probably fluctuating between 200
diate neighborhood could number
persons, but this figure would be
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a few residents each—probably 50

be greatly reduced from its number
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lement is a mile above Tanana on
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ozitna River and a few natives live

MMUNICATION.

ve easy access to all parts of the
by a fleet of well-equipped steam-
eattle vary with the nature of the
rsed, as indicated in the following

adrangles, Yukon-Tanana region, Alaska: Bull. U.

Freight and passenger rates from Seattle to towns in the Rampart and Hot Springs districts, based on tariffs of 1910–11.

Town and route.	General merchandise per ton.	Lumber per M.	Forage per ton.		Passengers.	
			Hay.	Grain.	First class.	Second class.
Rampart:						
Via Skagway	$82–$115	$77.50	$83	$77	$111	$80
Via St. Michael	58	87.00	58	58	115	90
Tanana:						
Via Skagway	84–117	79.50	85	79	115	81
Via St. Michael	50	75.00	50	50	111	85
Hot Springs:						
Via Skagway	89–125	84.50	90	84	125	90
Via St. Michael	55	82.50	55	55	115	90

Local freight rates from river points to the creeks vary according to the condition of the roads and the season of the year. In both the Rampart and the Hot Springs districts some excellent roads are maintained. The rapid development of the Sullivan Creek placers in the last two years has made necessary additional road improvements, which were being pushed during the summer of 1911. The summer rate on goods from Hot Springs to Tofty, a distance of 12 miles, was 5 cents a pound, and considering the difficulties of the present route this charge was not unreasonable. On the completion of the route under construction the rate will probably be reduced to about the present winter rate of 1½ cents a pound.

All the river communities are in touch with the United States military telegraph. Local telephone lines give service in the Rampart and Hot Springs districts. Regular United States mail service extends to all the settlements, both winter and summer.

INDUSTRIES.

The chief industry of the region is gold-placer mining. However, a considerable part of the population is engaged in mercantile pursuits, river transportation, and freighting. Fishing, woodcutting, lumbering, and agriculture receive considerable attention. The mining industry will be treated in this report in the section on economic geology. The mercantile business of the region is limited to a rather scant fur trade and to supplying the residents with necessary commodities. The steamboat traffic on the large rivers gives employment to a number of the inhabitants of the region, both native and white. Supplies are transported from river points to the inland towns and mining camps by team and pack train, outfits for this purpose being maintained in all the river settlements. The heavy demand for dried salmon to feed dogs with during the winter leads many persons to devote themselves to the fishing industry during the annual salmon runs. The fish are usually taken by means of fish wheels set in the margins of the larger streams. Supplying wood

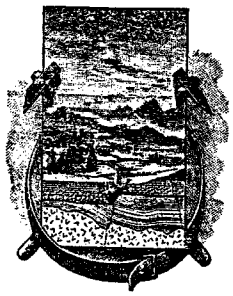
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 536

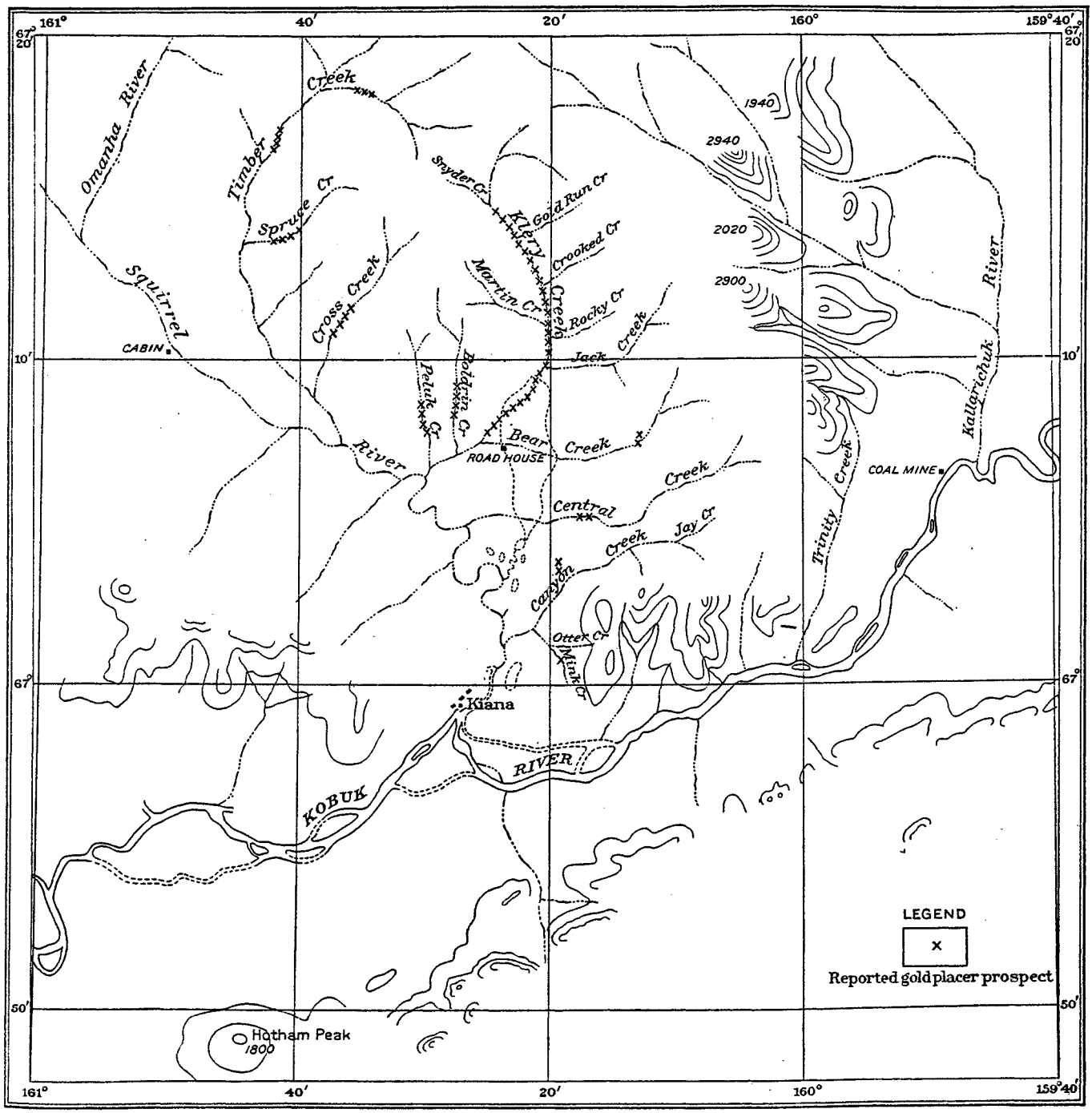
THE NOATAK-KOBUK REGION ALASKA

BY

PHILIP S. SMITH



WASHINGTON
GOVERNMENT PRINTING OFFICE
1913



1911

SKETCH MAP OF SOUTHEASTERN PART OF SQUIRREL RIVER BASIN.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 538

A GEOLOGIC RECONNAISSANCE

OF THE

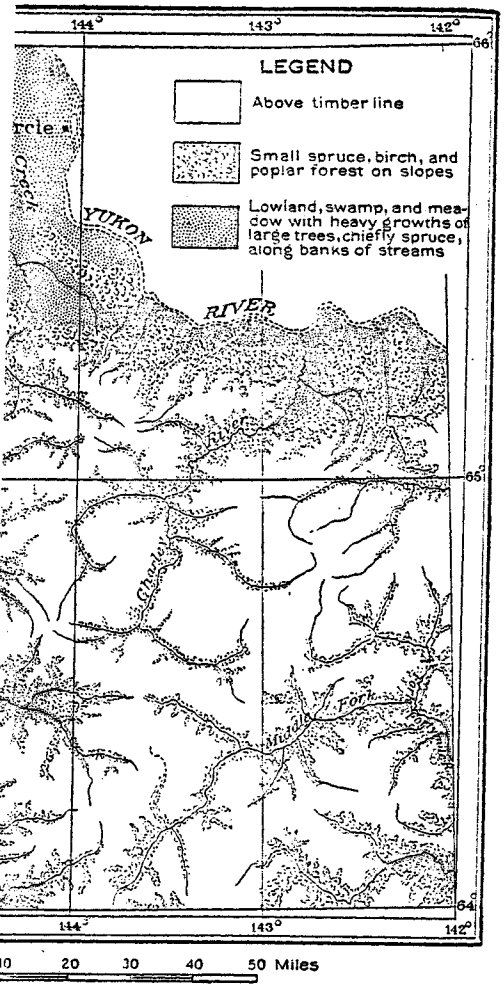
CIRCLE QUADRANGLE, ALASKA

BY

L. M. PRINDLE

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

ely bare or are dotted only with scatter-
ose of the Tanana are thickly timbered
id alder grow profusely along the smaller
area. Grass for horse feed is abundant
icularly near Yukon and Tanana rivers.



stribution of timber in the Circle quadrangle.

throughout a large part of the area.
grow in the vicinity of both the Yukon
rdy vegetables are grown in abundance
district.

POPULATION.

Most of the residents live in the northern part of the quadrangle, in the Circle district and on tributaries of the Yukon above Circle. A few prospectors are at work in the eastern, western, and southwestern portions of the area, and a few Indians spend part of the year at Kechumstuk and the mouth of the Goodpaster. The total permanent population does not exceed a few hundred.

In the Birch Creek district most of the population dwells on Mammoth, Mastodon, Miller, Eagle, and Deadwood creeks, 40 to 60 miles from Circle.

TRANSPORTATION.

The town of Circle, near the upper limit of the Yukon Flats, is the general supply point for the district and is connected with the creeks by a Government wagon road. Most of the heavy freighting is done in the winter at a cost of 3 to 6 cents a pound, but the construction of the wagon road has made it possible to obtain many kinds of supplies during the summer at only a slight advance over the winter rates, instead of, as formerly, only by pack trains at a cost of 20 to 25 cents a pound. Good road houses are located at intervals of about 12 miles along the wagon road from Circle to the creeks and others have been built upon the creeks. The trail from Circle to Fairbanks is traveled more or less every summer. The installation of a Government wireless station at Circle, connecting with other stations at Eagle, Fairbanks, and Rampart, has been of great advantage to the district.

The route for transportation from Pacific coast points to Circle is by way of either Dawson or St. Michael. The first-class passenger rate from Seattle to Circle by Dawson and the upper river in 1911 was $85. Freight rates have a great range, depending on the freight classification; on general merchandise the rate is about $60 a ton.

GEOLOGY OF THE YUKON-TANANA REGION.

The Yukon-Tanana region comprises many formations and has been affected by extensive metamorphism, great igneous activity, and close folding with two dominant trends—southeast-northwest and northeast-southwest.

One of the most extensive groups of rocks is made up of crystalline schists which are mostly of sedimentary origin and are regarded as pre-Ordovician. The presence of Ordovician, Silurian, Devonian, Carboniferous, Cretaceous, and Tertiary rocks has been established.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 576

GEOLOGY

OF THE

HANAGITA-BREMNER REGION

ALASKA

BY

FRED H. MOFFIT

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

ce vacated this part of the valley owth of spruce, rather than to the at higher elevations. Fires have valley as along the main Bremner.

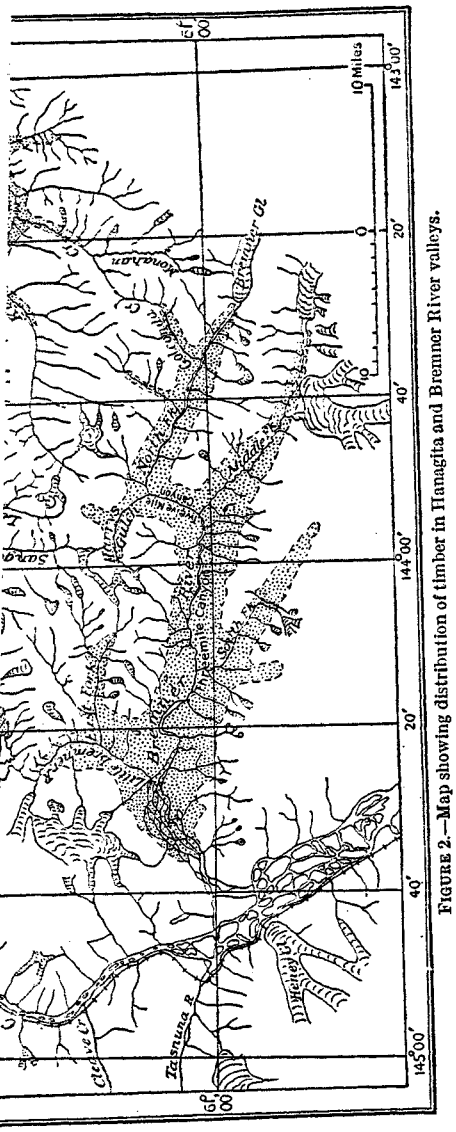


FIGURE 2.—Map showing distribution of timber in Hanagita and Bremner River valleys.

Bremner and Little Bremner valleys eight above timber line by a heavy climbing extremely difficult and tire- rs it impossible to travel with a pack ail. In favorable localities the alder

grows to a height of 12 to 15 feet, but the trunks, instead of standing erect, run along or near the ground, all commonly leaning in the same general direction. Those that grow on slopes lean downhill, being bent that way by the weight of snow that covers them during much of the year, but even those growing on a level show the same attitude and parallelism of trunks. The alders not only obstruct travel but hide outcrops and thus make prospecting difficult. Fortunately moss is not so plentiful in this region as in many other parts of Alaska, particularly along the Pacific coast, where the heavy precipitation is especially favorable to its growth. The devil's club, however, is common, and commands respect from those who have had experience with it.

Grass for horses is plentiful in nearly all parts of the Hanagita and Bremner valleys. Its growth is scant in some of the timbered valley bottoms, but it grows luxuriantly on the upper hill slopes near timber line. Bunch grass and redtop are the more common grasses, the first being found throughout the Hanagita Valley and sparingly on Bremner River, where the second prevails. Bunch grass does not grow so luxuriantly as redtop, but it cures early on the stalk and is less affected by the first frosts, and is consequently available for feed much later in the fall. Grass is found in parts of the district from late May or early June until the middle of September or first of October.

POPULATION.

There is no permanent white population east of Copper River in the district, but for many years there has been at Taral an Indian village consisting of 10 or 12 houses occupied by as many or more families. During the summer of 1911, 20 to 25 miners and prospectors were scattered through the two valleys: Three on Little Bremner River, three on Bremner River, seven on Golconda Creek, two on Klu River, and the rest in the vicinity of Taral and Canyon Creek. No attempt was made to count the Indians, who, during the summer, are scattered along the river at numerous fishing stations. Their chief is Goodlata, the son of Chief Nikolai, and an Indian of exceptional ability.

TRAILS AND TRANSPORTATION.

No trails have yet been well established through either the Hanagita or the Bremner River valley. The travel of white men there has been light and irregular, and the natives, notwithstanding the fact that they have passed back and forth in Hanagita Valley for many years, have not managed to establish a well-marked and continuous trail. In places distinct and unmistakable stretches of trail are found, but between them every man has chosen his own way. The route now followed starts at Taral, ascends Taral Creek to the lakes near its head, turns south to Canyon Creek, and then leads eastward through the valley to Chakina River. Five miles of this trail

between Taral and the head of Taral Creek was made as assessment work on a copper claim. It is steep but good, as is also the remainder to Canyon Creek, except about 2 miles of swampy ground on the summit between the lakes and Divide Creek. Through nearly all the Hanagita Valley travel is good except at the crossing of Sangaina Creek, a swift glacier stream flowing in a channel filled with large bowlders. In times of high water, notably at the end of warm summer days when the glaciers are discharging a large amount of water, horses have hard work to keep their feet while fording this stream and if once down have little chance of getting out.

Late in the fall of 1911 a new trail down Canyon Creek to Copper River was built for use in the winter freighting of supplies to the copper properties at the head of Canyon Creek. It avoids the steep hills of the older route and should considerably reduce the cost of freighting.

A trail up Monahan Creek and over the divide to Golconda Creek is used in both winter and summer. In most parts it is poor and it is interrupted in several places by newly formed beaver ponds.

In 1907 Decker and Mayman, owners of the placer claims on Golconda Creek, cut a trail down the north side of Bremner River from a point a short distance above the mouth of Golconda Creek to a point on Little Bremner River, 4 miles above its mouth. It was expected that the miners on the lower part of Bremner River would continue it to Copper River, but they failed to do so and it soon became overgrown with brush and blocked by fallen trees. In 1911 the Geological Survey parties cleared much of it and provided ways past several talus slides and bad places along the river so that at present this trail is in fair condition, for it was laid out over good firm ground. When it comes to be used more frequently easier slopes will be chosen to avoid several steep hills.

A trail that has been used much by foot travelers leads up Little Bremner River from the mouth of that stream to its head, but until 1911 this trail was impassable for horses at its upper end. A few days' work made it possible to take horses from the Little Bremner to Hanagita Valley by way of Tebay River, and if travel in this direction continues, a good trail can be established.

The problem of freight transportation into this region has been transformed by the completion of the railroad up Copper River. Where it was formerly necessary to carry supplies by sled over a long and difficult road before reaching the outskirts of the region it is now possible to place them by train within a comparatively short distance of their destination. Supplies for the lower part of Bremner River and the Little Bremner are landed near the mouth of Tasnuna River and carried on the river ice to the different camps. Prospectors near Taral get them at whatever point on the railroad may be most convenient—Chitina, Taral, or the mouth of Canyon Creek. The pros-

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GENERAL

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[1] The work of Johnson in Prince William Sound
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point on the railroad may be most con-
the mouth of Canyon Creek. The pros-

pectors and miners on Klu River and Golconda Creek ship their supplies and mining equipment to a point near the mouth of Nizina River, whence they are carried by sled up Chitina and Chakina rivers to Monahan Creek and thence to Klu River or over the divide to the gold placers of the Golconda. It will thus be seen that apart from the railroad freight charges, the cost of freighting to these three areas differs widely, being least to Bremner River and greatest to Golconda Creek. The cost of freighting to Golconda Creek was not learned, but any considerable quantity of freight could probably be landed there for 5 cents or less per pound, exclusive of railroad charges.

GENERAL GEOLOGY.

OUTLINE.

The general distribution of the principal formations of the Hanagita and Bremner River valleys is shown on the geologic map (Pl. II, in pocket) and their stratigraphic relations are represented in figure 3.

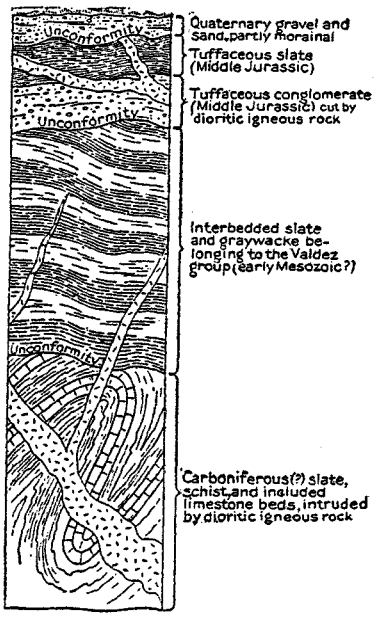

FIGURE 3.—Diagrammatic columnar section showing stratigraphic relations of the sedimentary beds exposed in the Hanagita and Bremner River valleys.

Two groups of sedimentary rocks occupy most of the area under consideration. The oldest consists of schist, slate, and limestone, which form the chief rocks of the mountains between the Hanagita Valley and Chitina River and of those south of the Hanagita Valley eastward from Copper River for nearly 30 miles. These sedimentary beds are folded, faulted, and much metamorphosed. Furthermore, they are intruded in a most complicated manner by igneous dikes and sills, which are chiefly dioritic, but include granitoid rocks of a more basic kind. A few Carboniferous fossils were found at one locality, but the group is based on structural and stratigraphic rather than on paleontologic evidence.

The second group of sedimentary beds consists of interstratified slate and graywacke, here classed as early Mesozoic (?) (Valdez group).[1] It adjoins the group first mentioned on the south and is exposed

[1] The work of Johnson in Prince William Sound during 1912 and 1913 has shown that some of the rocks included by previous workers in the Valdez and Sunrise groups are of Jurassic age. Martin, on the other hand, finds evidence in southwestern Kenai Peninsula indicating that part of the Sunrise group may be Paleozoic.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 578

THE IDITAROD-RUBY REGION ALASKA

BY

HENRY M. EAKIN

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

plentiful in the region as a whole. Bear are found but are not numerous. Wolves, foxes, martens, and weasels are at home in parts of the region.

AGRICULTURE.

The possibility of growing agricultural products, other than common garden vegetables, in this region has not been well tested. The summer temperatures are lower and the rainfall is a little greater than at Rampart, where agricultural experiments have been broadly successful. The Iditarod-Ruby region is probably on the whole not so well adapted to agriculture as the regions farther inland, but lettuce, radishes, turnips, and potatoes were seen growing in gardens on Innoko River and Ganes Creek.

SETTLEMENTS AND POPULATION.

The white inhabitants of the region are confined almost entirely to the vicinity of the mines. In the Iditarod district there are three principal settlements—Iditarod, at the head of steamboat navigation on Iditarod River; Flat, at the mouth of Flat Creek; and Discovery, on Otter Creek. Recent changes in methods of mining and in ownership in the district have occasioned a considerable loss in population. At present Iditarod may have an average population of about 500, Flat of about 300, and Discovery of about 50, exclusive of the miners. About 750 men are employed in mining in the district, so that its total population is about 1,600.

The chief settlement of the Innoko district is Ophir, on the south bank of Innoko River, at the mouth of Ophir Creek. It has an average population of about 50, and in addition about 150 people are engaged in mining in the district. A small community was established near the Cripple Creek Mountains, where gold was discovered in 1912. There are several small settlements, principally of native population, on the main Innoko River. The most important of these is Dishkakat, about 20 miles below the mouth of Dishna River.

The principal settlement of the Ruby district is the town of Ruby, on the south bank of the Yukon opposite the mouth of Melozi River. Its average population during 1912 was probably about 1,000. The district had an additional population of about 300, mostly engaged in prospecting and mining on a group of streams 25 to 30 miles south of Ruby. Part of this number were localized in a small settlement known as Long, near Discovery claim, on Long Creek.

TRANSPORTATION.

Steamboat service is maintained on Yukon, Kuskokwim, Innoko, and Iditarod rivers. The Yukon traffic is delivered at Ruby and also connects with that of Innoko River. Steamboat traffic on the Innoko is carried up as far as the mouth of the North Fork. Horse

U. S. GEOLOGICAL SURVEY

A. TIMBER LINE AT HEAD OF CAR

B. HORSE SCOW

scows afford the chief means of transportation above this point. (See Pl. V, *B*.) On Iditarod River the head of navigation during the greater part of the open season is Iditarod. During low-water stages of the river the larger steamboats may only reach Dikeman, a point about 80 miles below Iditarod. At such times small gasoline boats are used on the upper section of the river. The Kuskokwim traffic is delivered at Takotna River, in proximity to the Innoko mining district.

The Iditarod district receives all supplies by the river route. A tramway is in operation between Iditarod and Flat. From both Iditarod and Flat wagon roads have been built to all important mines. The road on Flat Creek is especially good, having been built for hauling heavy dredge machinery. Moore Creek receives supplies from Discovery over a pack trail. The total freight charges on goods from Seattle laid down at the mines is 4 to 6 cents a pound (1912).

The Innoko district receives supplies by way of both Innoko and Kuskokwim rivers. The latter route is coming largely into use owing to the lower charges. The total charges in 1912 on goods from Seattle laid down at the mines were 10 to 15 cents a pound.

The Ruby district gets all its supplies from Ruby. The ordinary freight charge on merchandise from Seattle to Ruby is $45 a ton. The rate charged for freighting from Ruby to the creeks in summer is 10 to 15 cents a pound. In winter the rate drops to 5 cents a pound or even less.

MEANS OF COMMUNICATION.

Mail service extends to all the settlements of the region during winter. In summer Ruby and Iditarod have a scheduled mail service; but Ophir, in the Innoko district, has no authorized mail service and depends upon a carrier who is compensated by public subscription.

The Iditarod district has a local telephone service between settlements and mines. A wireless-telegraph station at Iditarod gives long-distance service in connection with the United States military telegraph stations at Nulato and St. Michaels. The Innoko district is without telegraph or telephone service. The Ruby district has local telephone service and telegraphic connection with the Government lines.

OTHER CONDITIONS AFFECTING MINING.

Labor is plentiful in all the districts. In 1912 ordinary miners in the Ruby and Iditarod districts were paid $5 a day and board. In the Innoko district $6 a day and board was commonly paid.

The whole region is dependent for fuel upon cordwood, which ranges in price from $6 to $15 a cord, according to the availability of the timber supply. Rough lumber sold at Ruby in 1912 at $50 a thousand feet; dressed lumber at $80 a thousand feet.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 587

GEOLOGY AND MINERAL RESOURCES

OF

KENAI PENINSULA, ALASKA

BY

G. C. MARTIN, B. L. JOHNSON
AND U. S. GRANT

WASHINGTON
GOVERNMENT PRINTING OFFICE
1915

summer and autumn, when gasoline passenger cars are run almost every day. Freight trains are run only occasionally.

Wagon roads have been built from Sunrise to mile 34 on the Alaska Northern Railway, from Hope up Resurrection Creek for several miles, and from Girdwood to the Nutter-Dawson placer camp on Crow Creek. Roads have also been built from the mouths of Bear and Lynx creeks to prospects near their heads. The Alaska Road Commission has cut good trails from Hope to Sunrise and from mile 29 on the Alaska Northern Railway through Moose Pass to Slate Creek. A winter trail extends from the end of the wagon road on Crow Creek by way of Crow Creek Pass and Eagle River to Knik Arm. A trail has also been laid out down Canyon Creek from Moose Pass to the Sunrise road.

In winter most of the supplies are carried by dog teams. In summer pack trains are run at irregular intervals from mile 34 on the Alaska Northern Railway to Hope and Sunrise and from mile 29 through Moose Pass to Mills Creek. The following rates, averaging approximately $0.0025 per pound per mile, were charged in 1911:

Freighting charges in Seward-Sunrise region.

	Cents per pound.
Sunrise to Hope	2½
Sunrise to Gulch Creek	2
Sunrise to Lynx Creek	4 and 5
Sunrise to mile 34, Alaska Northern Railway	7
Gulch Creek to mile 34, Alaska Northern Railway	5 and 6
Mile 29, Alaska Northern Railway, to Mills Creek	5

Water transportation on the peninsula is restricted at present to Kenai Lake, where several small gasoline launches are in operation. This lake is reported to freeze over about January 1 and to open up late in May. Kenai and Kasilof rivers are navigable for canoes throughout their courses, and launches can ascend both streams for considerable distances. (See pp. 24–25.)

GEOLOGY.

GENERAL FEATURES.

The mountainous and the lowland districts of Kenai Peninsula are geologically unlike. (See Pl. III, in pocket.) The mountains are composed of thoroughly indurated, slightly metamorphosed, and highly folded rocks of Mesozoic or earlier age which, though chiefly of sedimentary origin, include some intrusive masses. The lowlands are composed of slightly indurated and gently folded Tertiary beds. Quaternary deposits occur in both parts of the peninsula, but are much more widespread in the lowlands. The following table shows the general stratigraphic sequence and the correlation of the formations in southern and southwestern Alaska:

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 592

MINERAL RESOURCES OF ALASKA

REPORT ON PROGRESS OF INVESTIGATIONS IN 1913

BY

ALFRED H. BROOKS AND OTHERS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

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RAINAGE BASIN.

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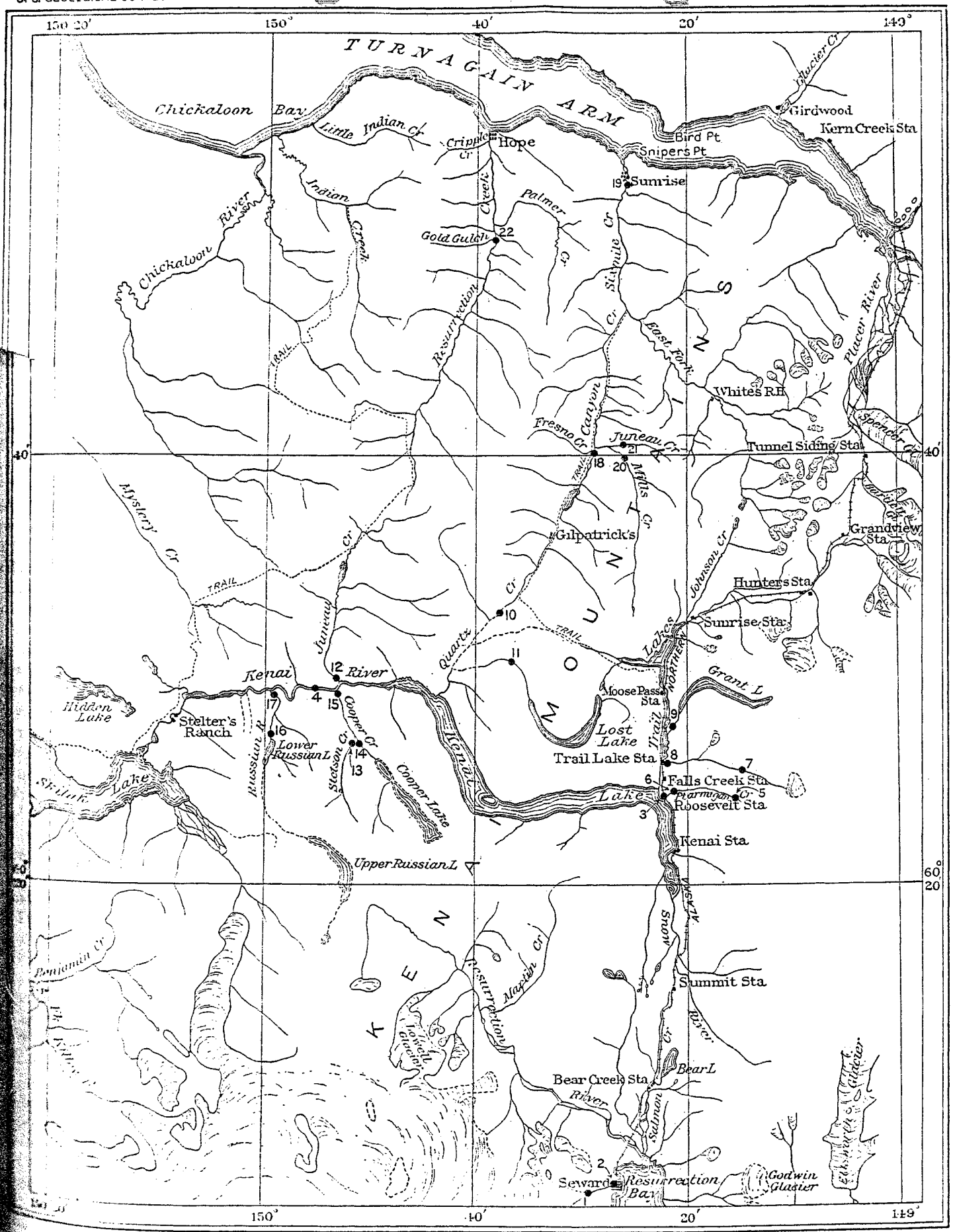
MAP OF THE COPPER RIVER BASIN.



6 ● Point of measurement; number refers to list in text

0 5 10 20 Miles

MAP OF THE EASTERN PART OF KENAI PENINSULA.

GLACIATION.

The present surface forms of this district are in large measure due to the erosive action of the great glaciers which once occupied all the valleys. Four glaciers still exist in the district (see Pl. X), but these are all small and are only the disappearing remnants of vastly greater ice tongues. At a time geologically not long ago all the larger valleys of the Talkeetna Mountains were occupied by ice tongues which pushed down from the valley heads and extended beyond the mountain borders. The Susitna Valley was then occupied by a great ice field, extending at least as far south as the Forelands, and the Matanuska Valley contributed a great ice stream to this glacier.

ROUTES OF TRAVEL.

The village of Knik, on the northwest shore of Knik Arm, is the center of supplies for the Willow Creek district. Knik is above the head of navigation for ocean-going vessels and can be reached by launch only at high tide. At low tide the tidal flats off the town are bare. The upper part of Cook Inlet is closed to navigation during half of the year on account of the formation of ice. During the open season of 1913 one steamship, plying from Seattle through southeastern Alaska to ports on the Gulf of Alaska and Cook Inlet, made trips at intervals of three weeks to Knik Anchorage, at the mouth of Knik Creek, about 18 miles below Knik. From the anchorage all freight is lightered in scows to Knik, and passengers are transferred by launch. Steamships of another line call weekly at Seldovia, in lower Cook Inlet, and some freight and passengers are brought to Knik from that point in small steamers or launches. In the winter the mail is brought by dog sled overland from Seward to Turnagain Arm, and thence across the divide at the head of Crow Creek and around the head of Knik Arm to Knik, but this service is slow and irregular.

From Knik to the mines of the Willow Creek district two summer trails were formerly in general use. One headed north from Cottonwood, crossed the Bald Mountain ridge to Wet Gulch, and thence followed up Willow Creek to the camps. This trail is still used occasionally. The other route was the old Carle wagon road from Knik, leading in a northeast direction to Little Susitna River below the canyon and thence up that stream and Fishhook Creek. In the spring of 1913 a new wagon road, following in a general way the route of the Carle road, was completed by the Alaska Road Commission to Upper Fishhook Creek. This road is well graded, is furnished with good bridges, and is now used for practically all the summer travel to the mines and also for winter travel to the Fishhook and Little Susitna basins. The winter road for sledding to upper Willow Creek leads north from Knik, skirts the west end of Bald Mountain Ridge, and proceeds up Willow Creek.

MINING IN THE VALDEZ CREEK PLACER DISTRICT.

By FRED H. MOFFIT.

Valdez Creek is a headwater tributary of Susitna River. It lies about 65 miles west of the Valdez-Fairbanks road and is one of the three known placer-gold districts on the south slopes of the Alaska Range.

Gold was discovered on Valdez Creek in the fall of 1903. The first gold produced was taken from gravel deposits along the stream, but gold was found later in an old buried channel of Valdez Creek that joins the present channel on claim No. 2 above Discovery. The claims along this gravel-filled canyon proved to be some of the most valuable property in the district, although other claims on Valdez Creek and some of its tributaries, notably Lucky Gulch, have been gold producers.

The district was visited by United States Geological Survey parties in 1910, and the progress made in exploiting its gold deposits at that time was described in a paper published the following year.[1] During the three years since 1910 mining has been carried on in the old channel gravel deposits, on one or two of the creek claims near by, and on Lucky Gulch. In addition, assessment work has been performed on many other claims that have not been important gold producers.

Since 1910 the Monahan tunnel in the old canyon gravels has been extended about 500 feet, or from 700 to 1,200 feet, thereby proving that the gold-bearing gravels continue that distance but yielding no evidence to indicate where the east end of the canyon is situated. Bad air made work in the tunnel slow and difficult, yet mining was conducted profitably so long as the work was carried on. The tunnel is now abandoned, the need for it having been ended by the introduction of hydraulic mining.

Since 1910 nearly all the claims on the lower part of Valdez Creek, including the bench claims north of the creek through which the old channel runs, have come under the control of the Valdez Creek Placer Mines Co. This company in 1913 installed a small hydraulic plant

[1] Moffit, F. H., The upper Susitna and Chistochina districts: U. S. Geol. Survey Bull. 480, pp. 114–124, 1911. See also Moffit, F. H., Headwater regions of Gulkana and Susitna rivers, Alaska: U. S. Geol. Survey Bull. 498, pp. 53–65, 1912.

and began mining at the lower or west end of the old channel where the Monahan tunnel begins. Nearly a mile and a quarter of ditch was constructed and a line of pipe was laid to the giant at the working face. With this plant enough of the gravel filling in the old canyon was removed between the first of August and the end of the season to lay bare a small area of bedrock.

This work was preliminary to the installation of a larger plant in 1914. It is planned to replace the small pipe now used by about 4,800 feet of pipe ranging in size from 36 inches at the penstock to 18 inches at the pit and to substitute 6-inch giants for the small ones. This equipment will make available an abundant supply of water under a head of nearly 300 feet. About 100 feet of head is lost under the present arrangement, for the pipe at hand was too short to reach from the giants to the ditch, and the water had to be turned into a depression and picked up again at a lower level. A sawmill will be built and also an electric plant, operated by water from Timberline Creek, to furnish light and power.

The old channel of Valdez Creek is favorably situated for hydraulic mining, there being a good supply of water and an excellent dump for tailings. It is probable, however, that the large number of granite bowlders in the upper part of the gravel deposit will cause considerable trouble.

The well-established winter trail on the ice of Gulkana, Maclaren, and Susitna rivers is still used for carrying freight to Valdez Creek, but the summer trail leaving the Valdez-Fairbanks road at Bear Creek below Gulkana is now practically abandoned in favor of the shorter trail from Paxson.

The gold production of the Valdez Creek district in 1913 was small, coming in large part from Lucky Gulch, for, as has been shown, most of the season was given up on the main stream to what may be called dead work. Probably not over 25 men were engaged in mining in the district at any one time during the summer, but it is expected that this number will be nearly doubled in 1914.

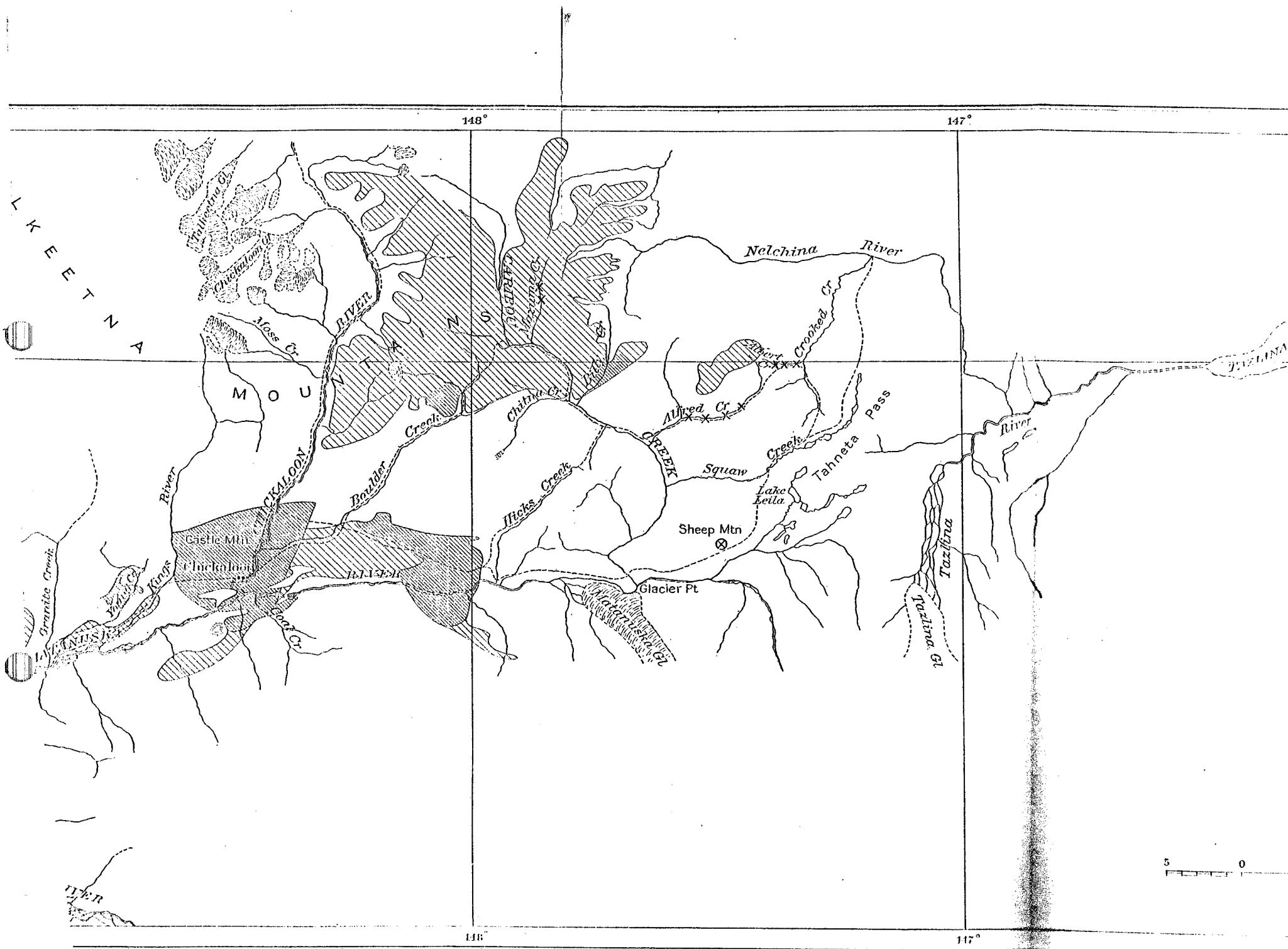
THE CHISANA P

By ALFRED

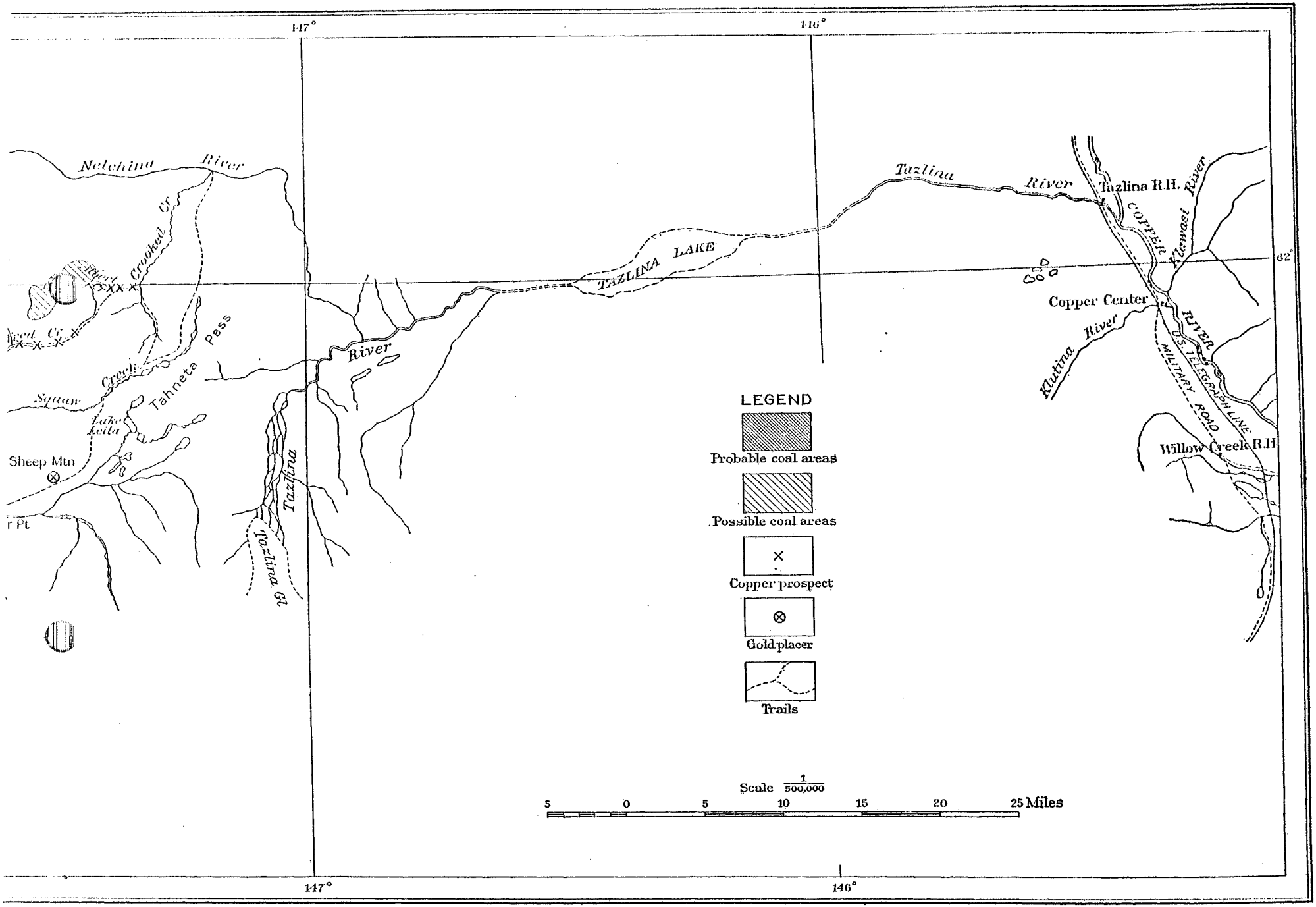
INTROD

The Chisana placer district, comprises an ill-defined area lying River (sometimes known as the Tabesna to form the Tanana, wh The discovery of gold placers in local point of interest to miners large influx of people from all pa side of the Territory. This region ber of the Survey since the findi and topography are, however, fa surveys, and much data on the c been obtained from several reliab While exploring White and T and the writer passed about 40 m gold was discovered,[1] and the fol an exploration [2] which traversed about the same time Rohn [3] re Wrangell Mountains from the so made in the same field in 1902 [4] denhall. The most comprehensiv Moffit, Knopf, and Capps,[5] who topographic mapping of this area. Since the discovery of placer go by D. D. Cairnes, of the Geologic has kindly furnished the writer with an advance copy of a pap

[1] Brooks, A. H., A reconnaissance in the White
Survey Twentieth Ann. Rept., pt. 7, pp. 425–494, 1
[2] Brooks, A. H., A reconnaissance from Pyrami
Twenty-first Ann. Rept., pt. 2, pp. 331–391, 1900.
[3] Rohn, Oscar, A reconnaissance of the Chitina
Twenty-first Ann. Rept., pt. 2, pp. 393–440, 1900.
[4] Mendenhall, W. C., and Schrader, F. C., The m
U. S. Geol. Survey Prof. Paper 15, 1903.
[5] Moffit, F. H., and Knopf, Adolph, Mineral res
with a section on the Quaternary by S. R. Capps:
[6] Cairnes, D. D., Chisana gold fields: Canadian M



SKETCH MAP SHOWING MINERAL RESOURCES OF MATANUSKA AND NELCHINA VALLEYS.



OF MATANUSKA AND NELCHINA VALLEYS.